all of which is of great value in establishing the coefficients of the evaporation equation. Observations of this nature can be obtained, however, quite as well by other methods of exposure.

Laboratory experiments.—Our inability to control in any way the several factors that influence evaporation in nature not only makes field investigations difficult and the results uncertain, but suggests the desirability of making such investigations by so-called laboratory methods. Fitzgerald's experiments on the effects of water temperature on evaporation are a notable contribution of this character. The writer is strongly in favor of a vigorous campaign on evaporation by laboratory methods. At the same time the great difficulty of producing and maintaining artificially all the desired conditions on a sufficiently large scale is recognized and constitutes quite as serious an obstacle to ultimate success as the difficulties encountered in field work.

II.

Yet a second class of observations is required in solving the question of evaporation from free water surfaces, viz, those necessary to bring out the laws of distribution of the variable evaporation over any considerable expanse of water. This has been fully explained in connection with fig. 1 and equation (1) above, but so far as known to the writer no systematic study of the problem has been attempted.

In the opinion of the writer, observations from pans floating in the water are almost the only data we can procure from which we may hope to be able to compute the true evaporation from an extended free water surface. The plan of calculating the evaporation from a few observations of temperature, wind, and vapor pressure is certain to prove crude and inaccurate unless the plan is carried out on a far more elaborate basis than is commonly expected. An observation of evaporation is a very definite and exact integration of a very subtile and highly variable phenomena. I think it is decidedly easier, more exact, and more scientific to actually *observe* the integrated result sought after than to try to compute a result from scanty observations upon several other phenomena to which the evaporation is indirectly related. The latter plan is only justified for crude results and when the more exact method is not available.

It has seemed worth while to bring out with some clearness all the general facts and principles presented in the foregoing because separately they will be found abundantly supported by the past literature of evaporation, but collectively they have not all been systematically and consistently regarded by each or any individual worker. No one may hope to formulate the true general laws of evaporation applicable anywhere and everywhere without paying careful regard to the lessons that are taught by the work and mistakes of others.

Section II of this paper will describe instrumental apparatus.

[*To be continued.*]

A CHRONOLOGICAL OUTLINE OF THE HISTORY OF METEOROLOGY IN THE UNITED STATES OF NORTH AMERICA.

[*Continued from the Monthly Weather Review, March, 1909.*]

1851. E. E. Merriam, "The Sage of Brooklyn Heights," began the publication in the New York daily papers of a series of articles on "Heated terms and other weather phenomena." In 1853–1855 he frequently ventured on local weather forecasts, based in part on his own observations in Brooklyn, but largely on the telegraphic reports published daily in the newspapers.

1852. October. Date of Espy's fourth meteorological report, addressed to the Secretary of the Navy; called for by Congress July 24, 1854; referred to the Secretary of the Smithsonian Institution; ordered printed; published in 1857, with numerous notes which brought it up to the date of publication. This fourth report also reprints all of Espy's preceding reports.

1852. First edition of Arnold Guyot's collection of "Meteorological tables for Smithsonian Observers." A second edition appeared in 1857; a third edition in 1859; a fourth, or Libbey's edition, in 1884; a fifth, or Curtis's edition, in 1893; a sixth, or McAdie's edition, in 1896; a seventh, or third revised edition, in 1907.

1853. Meteorological stations established at grammar schools in Canada.

1853. Mr. Joseph Brooks, manager of a line of steamers between Boston and Portland, is said to have used the telegraph freely in obtaining information about the weather as affecting his navigation.

1853. Lieutenant M. F. Maury secures an International Meteorological Conference at Brussels, leading up to cooperation in marine work.

1853. William Ferrel (*b.* 1817, *d.* 1891) published a first popular article on the effect of the rotation of the earth on the winds and the ocean currents.

1853. November. James Henry Coffin (*b.* 1806, *d.* 1873) published his "Winds of the Northern Hemisphere" as a result of many years of work.

1853. Lorin Blodget published "On the Abnormal Atmospheric Movements of the United States," in the Proceedings A. A. A. S., 1853.

1854. Prof. Joseph Henry reported that the telegraph companies were furnishing the Smithsonian Institution with daily morning weather reports. He had suggested the custom, which became established, in accordance with which the first message each morning on opening any telegraph office was in answer to the salutation, "Good morning, what is the weather?" Each local operator gave to his division superintendent and the local newspapers a statement of these weather reports, viz, temperature, wind, and weather, and all of them were telegraphed to the Smithsonian Institution, where they were exhibited on a large wall map day after day during the years 1854–1861. These reports were frequently used by Professor Henry to predict or show the possibility of predicting storms and weather, a matter that he frequently urged on the attention of Congress. Espy and Henry were the prime movers in all matters of storm predictions both in this country and in Europe.

1855–1859. A series of five papers by Joseph Henry on "Meteorology in its Relations to Agriculture," published in the reports of the Commissioner of the Patent Office. They were reprinted (1886) by the Smithsonian Institution as Vol. II of Henry's Scientific Writings.

1856. Lieut. Silas Bent, U. S. N., initiates the Gulf Stream and Japan Current delusion.

1856. Espy invented his double nepheloscope and showed that expansion alone into a vacuum does not produce cloud or cooling since there is no work done by the expansion.

1857. Lorin Blodget (*b.* 1823, *d.* 1901), published his "Climatology of the United States."

1857. October 22–November 17, Espy ordered to transfer his work from the Smithsonian Institution to the U. S. Naval Observatory.

1857. William Barton Rogers (*b.* 1805, *d.* 1882), published in Silliman's Journal, a paper on the breaking up of a steady current of wind into an anticyclone on the right-hand side, and a cyclone on the left-hand side.

1858–1860. William Ferrel, published in the American Mathematical Monthly, a mathematical memoir on the motions of solids and of the atmosphere on the surface of the earth. This was followed eventually by his Meteorological Researches, Part I, 1875; Part II, 1878; and Part III, 1881; and by his joining the meteorological division of the U. S.

Signal Service in 1882; by the publication of his "Recent Advances," (1885), his "Popular Treatise on the Winds," (1889), and other special papers.

1860. Loomis published "On Certain Storms of 1836 in Europe and America."

1865. The Smithsonian Institution published Part I of Meteorological Records of Storms during the years 1854–1859. Part II was published about 1868.

1865. The U. S. Commissioner of Agriculture, Hon. Isaac Newton, indorsed the recommendation of Prof. Joseph Henry that a weather service be established for the benefit of agriculture, more extensive than that which had been maintained hitherto by the Smithsonian Institution in connection with the U. S. Commissioner of Patents.

1868. Dr. B. F. Craig, of the Surgeon General's Office, improved the apparatus and introduced a protected sling-psychrometer at the stations under his control.

Publication of Loomis' Treatise on Meteorology.

Establishment of the New York Meteorological Observatory under the control of the Central Park Commission. Annual volumes of observations have been published and automatic records maintained by the director, Dr. Daniel Draper.

1868. May 1. In an inaugural address as Director of the Cincinnati Observatory, Prof. Cleveland Abbe (*b.* Dec. 3, 1838) proposed the establishment of a weather service and forecasts for the benefit of the citizens of Cincinnati. In July, 1868, the Cincinnati Chamber of Commerce authorized cooperation with the Cincinnati Observatory in this work.

1869. In August of this year the Cincinnati Chamber of Commerce officially invited the Chicago Board of Trade to unite in extending the benefits of its daily weather bulletin to the lake region; the matter was referred by the Chicago Board of Trade to the Chicago Astronomical Observatory, where the offer was declined.

1869. September 1. Telegraphic reports and "Weather Probabilities" began under the auspices of the Cincinnati Chamber of Commerce; "The Weather Bulletin of the Cincinnati Observatory" began, and maps and bulletins were also published in the daily papers of Cincinnati.

1869. In November Prof. Increase Allen Lapham (*b.* 1811, *d.* 1875) and Hon. H. E. Paine, of the Milwaukee Board of Trade, united with William Hooper and John A. Gano, of the Cincinnati Chamber of Commerce, in securing a resolution by the National Board of Trade, then meeting in Richmond, Va., asking Congress to establish a storm-warning service for all lake ports and sea ports.

1870. February 2. Mr. Armstrong, local manager of the Western Union Telegraph Company, added a manifold weather map to the previous manifold weather bulletin issued at Cincinnati; and these continued until November 10, 1870, when the daily weather map of the Signal Service began. The maps and bulletins issued from the Cincinnati Observatory embraced the region from Wyoming and Texas eastward over the United States, northward to St. Paul, and Southward to Havana.

1870. February 9. The Congress enacted the joint resolution:

"Be it resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War be, and he hereby is, authorized and required to provide for taking meteorological observations at the military stations in the interior of the continent and at other points in the States and Territories of the United States, and for giving notice on the northern lakes and on the seacoast, by magnetic telegraph and marine signals, of the approach and force of storms."

1870. March. The Secretary of War assigns to Gen. A. J. Myer, Chief Signal Officer, U. S. A., the duty of executing the preceding joint resolution. His first step was the establishment of a school of instruction in meteorology at Fort Whipple, now Fort Myer, in addition to the former course in military signaling. This school continued until abolished in 1886 by order of the Secretary of War.

1870. In July. Prof. I. A. Lapham was appointed Assistant Chief Signal Officer, doing duty at Milwaukee and Chicago.

1870. November 1. The inauguration of the Signal Service Circuit System (devised by George C. Maynard) for transmitting station reports simultaneously by telegraph, and the publication of the first weather bulletin of the Signal Service.

1870. November 8, Professor Lapham and Gen. Albert J. Myer (*b.* 1828; *d.* 1880) published the first bulletin announcing storms on the lakes.

1870. December 5. A meteorological station established at the summit of Mount Washington, N. H., in continuation of one started in September, 1870, by the State Geological Survey of New Hampshire. It was maintained by the U. S. Signal Service from December 5, 1870, to September, 1887.

1871. January 3. Prof. Cleveland Abbe was appointed assistant in the office of the Chief Signal Officer, for duty at Washington, D. C.

1871. February 19. First "Weather Probabilities" published by the Signal Service as prepared by Professor Abbe, who continued preparing them thrice daily until February, 1872, when Lieut. Robert Craig, of the Signal Service, began to alternate with him.

1871–1909. U. S. Weather Bureau Forecasts. The regular published weather predictions began February 19, 1871; they were called "Probabilities" and were made three times daily for such elements and periods in advance as seemed warranted by the maps, and for eight geographical districts, viz: New England, Middle States, South Atlantic States, Lower Lakes, Upper Lakes, Eastern Gulf, Western Gulf, and Northwest.

Beginning October, 1872, predictions were made for twenty-four hours in advance and for nine separate districts. During the year ending June 30, 1874, they began to be made for eleven districts and for four elements, viz, weather, wind, pressure, and temperature. During the year ending June 30, 1875, they were made for 10 districts. No change was made until July, 1885, when predictions were made for thirty-two hours in advance or for a twenty-four hour period beginning eight hours after the observation on which they are based. Since July, 1888, predictions have been made thirty-six hours in advance, and beginning August 1, 1898, forecasts based on the evening reports have been regularly made for forty-eight hours in advance. Beginning with May, 1886, predictions have been made by States and parts of States instead of districts. The term "indications" was substituted for "probabilities" on December 1, 1876, and this was changed to "forecasts" on April 1, 1889.

1871. In April, May, and August appeared successive editions of the pamphlet "Practical Uses of Meteorological Reports and Maps, or How to Use the Weather Map."

1871. Commodore M. F. Maury urged that the work of the Signal Service for the prediction of storms on the seacoast and lake ports be extended to include reports and forecasts for the benefit of agriculture.

1871. The appropriation bill authorized additional reports relative to the stages of the water in the rivers. These reports began in 1872.

1871. The Chief Signal Officer delegated Frederick Myers as meteorologist to the polar expedition of Capt. C. F. Hall on the ship *Polaris*. In 1873 Myers returned, having floated 1,800 miles on an icefloe until rescued.

1871. May. The first circulars sent out to captains and owners of vessels requesting tridaily simultaneous observations at sea.

1871. June 18. Thompson B. Maury was appointed assistant in the office of the Chief Signal Officer.

1871. October 23. Institution of a system of "Cautionary" storm and wind signals as supplementary to the text of the "Probabilities."

1871. November 13. Inauguration of a system of international exchange between the Weather Bureaus of the Dominion of Canada and the United States, thus extending our weather maps northward.

1871. December. Prof. A. S. King, aeronaut, offered to take observations on his ascensions and in every way possible to cooperate in the study of the atmosphere. This arrangement continued up to the close of the series of ascensions by him from Philadelphia, in 1885.

1871–72. The Smithsonian Institution published in its Contributions to Knowledge, a discussion by C. A. Schott of its collection of precipitation observations in the United States, Canada, Mexico, and South America. A second edition appeared in 1881.

1872. March. Beginning of the publication of the monthly volumes of weather maps under the title "Synopses, Probabilities, and Facts," which was continued until 1877.

1872. June 10. The appropriations bill provided for "such additional stations, reports, and signals as may be found necessary for the benefit of Agricultural and Commercial Interests."

1872. Three Signal Service stations were opened in the West Indies, to which three more were added in 1874.

1872. September. The "Weekly Weather Chronicle," a summary of features affecting agriculture, as devised and compiled by Henry Calver, began and continued until 1881.

1873. The first, or January, number of the MONTHLY WEATHER REVIEW was published by the U. S. Signal Service as suggested and prepared by Professor Abbe. This monthly was materially enlarged year by year and still continues to be published by the Weather Bureau.

1873. The Signal Service accepted the care of the Dudley Observatory, at Albany, N. Y., as a meteorological station and authorized the local Signal Service observer, Alois Donhauser, to use its apparatus for the determination of local time for public use.

1873. The Surgeon General of the Army, the Secretary of the Smithsonian Institution, and the Chief Engineer of the U. S. Army, relinquished meteorological work and transferred all earlier records to the Signal Service. Thus the climatology of the country was concentrated in the Signal Service archives, and it was enabled to make a corresponding increase in its records and in the completeness of the MONTHLY WEATHER REVIEW.

1873. Gen. Albert J. Myer, as Chief Signal Officer, invited all nations individually through their representatives, to cooperate with him in making and collecting one simultaneous observation daily to be made at 7:35 a. m., Washington time. After several nations had promised cooperation General Myer attended the First International Congress of Meteorology at Vienna in September and requested it to indorse his proposition, which it did.

1873. July 21. A Signal Service station was established on the summit of Pikes Peak, and was maintained to the end of 1888. It was reopened September, 1892, and closed September, 1894.

1873. The "Weather Case," or "Farmer's Weather Indicator" began to be distributed to the country post offices, and the farmers' bulletins displayed at all other post offices, until local flag signals took their place about 1881.

1874. Charts of frequency of storm paths, etc., were prepared by Prof. Cleveland Abbe and published in Walker's Statistical Atlas.

1875. The Smithsonian Institution published Coffin's "Winds of the Globe," with an Appendix by Prof. A. Voeikov.

1875. The beginning of cooperation between the Signal Service and the U. S. Fish Commission in the observation of water temperatures at seaports, lakeports, and river stations.

1875. July 1. The beginning of the publication of the "Bulletin of International Simultaneous Observations." Daily maps were added to this Bulletin in 1877. This bulletin was considered as printed manuscript for exchange with the observers only, and continued daily through 1887, with monthly and annual summaries through 1889. The transfer of marine meteorological work to the Hydrographic Office in 1887 contributed to the interruption of this publication, but the simultaneous observations still continue to be made throughout the world at nearly the same hour, viz, 1 p. m. Greenwich time.

1875. May. The President of the American Metrological Society appointed Prof. Cleveland Abbe chairman of a "Committee on Standard Time." The report of this committee advocating hourly meridians from Greenwich was dated May 20, 1879, and under the leadership of W. A. Allen its recommendations were, with some few changes, put into effect by the railroads of the country on October 7, 1884, a few days before the meeting at Washington of the International Congress on Standard Time.

1875. Prof. Gustavus Hinrichs, of Iowa City, published the first bulletin of the Iowa State Weather Service, which latter was eventually merged into the Iowa section of the Signal Service Weather Bureau.

1876. The Secretary of the Navy ordered simultaneous meteorological observations made on all naval vessels.

1876. Establishment of Signal Service observering stations at Fort St. Michaels and at St. Paul Island, Alaska. By 1882 quite an extensive Alaskan system had developed.

1876. The Smithsonian Institution published in its Contributions to Knowledge, a discussion by C. A. Schott of its collection of temperature observations in the United States. This publication was started in 1874 and completed in 1876.

1877. A section on international meteorology was added to the MONTHLY WEATHER REVIEW.

1877. Establishment of the Central Meteorological Observatory of Mexico and the beginning of its cooperation with the United States service.

1877. The Signal Service contributed to the observing force and apparatus for Arctic work on the schooner *Florence* in Cumberland Sound, which was intended as preliminary to further exploration.

1878. Prof. Francis E. Nipher started the Missouri State Weather Service.

1878. In July the Signal Service occupied the summit of Pikes Peak, Colo., as its station for observing the total eclipse of the sun. The results were published as U. S. Signal Service Professional Paper No. 1.

1879. The U. S. Coast and Geodetic Survey published the "Coast Pilot of Alaska, Appendix I," which was an exhaustive summary of all existing meteorological observations in Alaska. It was prepared by William H. Dall and Marcus Baker in 1878, and was the first adequate presentation of the climatic and meteorologic features of the Territory.

1880. Mr. A. Lawrence Rotch founded the Blue Hill Meteorological Observatory, Hyde Park, Mass., for special research in meteorology.

1880. May. Congress authorized the establishment of a temporary meteorological station at Lady Franklin Bay, but the expedition returned disabled.

1881. February. Lieut. P. H. Ray was assigned to the command of the party designed to occupy the signal station at Point Barrow, Alaska, and sailed from San Francisco July 18. The Point Barrow expedition returned in 1883.

1881. March 11. Lieut. A. W. Greely was assigned to the charge of the second expedition to Lady Franklin Bay and sailed from St. Johns, N. F., on July 7. The surviving members of this expedition were rescued and brought home by Capt. W. S. Schley, U. S. N., in July, 1884.

1881. April 11. The first circular recommending the establishment of independent cooperating State weather services was issued.

1885

1881. July. A Signal Service expedition to the summit of Mount Whitney, Cal., was organized in charge of Prof. S. P. Langley for the study of the sun's heat as received by the atmosphere. The report is published as Signal Service Professional Paper No. XV.

1881. September. Inauguration of a system of "Cotton Belt" observations and reports.

1881. Inauguration of work on the General Bibliography of Meteorology. This work, which has proved to be important to those studying the subject, was pushed forward rapidly until 1893 by which time four sections had been published. (These sections were not printed but mimeographed.)

1881. Inauguration of special warnings for the benefit of the sugar interests of Louisiana.

1881. The two systems of observations that had been thus far maintained—7 a. m., 2 and 9 p. m., local time, and 7:35 a. m., 4:35 and 11 p. m., simultaneous Washington time—were discontinued, and a systematic record at 3, 7, and 11 a. m., 3, 7, and 11 p. m., Washington time, was begun and maintained at nearly all stations until 1884, when it was changed from Washington to seventy-fifth meridian time.

1881–1886. From 1881 to 1886 were published a quarto series of Professional Papers and an octavo series of Signal Service Notes.

1881–1891. Prof. Elias Loomis of Yale University published summaries of the results of his studies of the daily weather map of the Signal Service, in the American Journal of Science.

1881. In this year and during a portion of 1882, the first "local weather forecasts" for publication were made at the New York office of the weather service by E. B. Garriott.

[*To be continued.*]

RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

C. FITZHUGH TALMAN, Librarian.

The following have been selected from among the titles of books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Most of them can be lent for a limited time to officials and employees who make application for them. Anonymous publications are indicated by a ——.

Apia. Samoa Observatorium.
...Ergebnisse der Arbeiten des Samoa-Observatorium der Königlichen Gesellschaft der Wissenschaften zu Göttingen. II. Die meteorologischen Registrierungen der Jahre 1902–1906 von Otto Tetens and Franz Linke. Berlin. 1908. 137 p. 4°. (Abhandlungen der Königlichen Gesellschaft der Wissenschaften zu Göttingen. Mathematisch-physikalische Klasse. Neue Folge. Bd. 17. Nro. 2.)

Batavia. Royal magnetic and meteorological observatory.
Magnetic survey of the Dutch East Indies made in the years 1903–1907 by W. van Bemmelen. Batavia. 1909. 69 p. f°. (Appendix 1 to Observations ... v. 30, 1907.)

Belgium. Observatoire royal.
Annuaire météorologique. 1909. Bruxelles. 1908. vii, 203 p. 24°.

Bosnia-Herzegovina.
Ergebnisse der meteorologischen Beobachtungen. 1906–1907. Sarajevo. 1908. xvi, 173 p. f°.

Delatour, A. J.
A daily record of the thermometer for ten years, from 1840 to 1850, as kept at Delatour's, formerly Lynch & Clarke's, 25 Wall street, New York. New York. 1850. 46 p. 16°.

Denmark. Danske meteorologiske Institut.
Nautisk-meteorologisk Aarbog. Kobenhavn. 1909. lii, 169 p. f°.

Egypt. Survey department.
Meteorological report 1906. Cairo. 1908. v. p. f°.

Fortschritte der Physik.
1te Abtheilung. 1908. Braunschweig. 1909. xxxii, 573 p. 8°.

Ghent. Université.
Annuaire météorologique de la Station de géographie mathématique. Mars 1908–Février 1909. Roulers. 1909. 91 p. 12°.

Greifswald. Meteorologische Station.
Die Ablesungen der meteorologischen Station Greifswald vom 1. Januar bis 31. Dezember 1908 nebst Jahresübersicht über das Jahr 1908. Greifswald. [1909.] 50 p. 8°.

Hamburg. Hauptstation für Erdbebenforschung am Physikalischen Staatslaboratorium.
Calabrisch-sizilianisches Erdbeben am 28. Dezember 1908. I & II. 2 sheets. 27 x 100 cm.
Erdbeben in Persien (Provinz Luristan) am 23. Januar 1909. 1 sheet. 27 x 93 cm.
Vogtländische Erdbebenstösse am 4. und 6. November 1908. 1 sheet. 27 x 100 cm.

Haute-Garonne. Commission météorologique.
Bulletin. Tome 2. 1er fasc. 1906. Toulouse. 1908. 58, [169] p. 4°.

India. Board of scientific advice.
Annual report. 1907–08. Calcutta. 1909. iii, 182 p.

India. Meteorological department.
Rainfall of India. 1907. Calcutta. 1908. v. p. f°.

International meteorological committee.
Codex of resolutions adopted at international meteorological meetings, 1872–1907. Prepared at the request of the International meteorological committee, by H. H. Hildebrandsson and G. Hellmann. London. 1909. 80 p. 8°.

Jahrbuch der Astronomie und Geophysik.
19 Jahrgang 1908. Leipzig. 1909. viii, 384 p. 8°.

Japan. Central meteorological observatory.
Annual report. 1906. pt. 1. [Tokyo. 1909.] f°.

Mache, H., & Schweidler, E. v.
... Die atmosphärische Elektrizität. Methoden und Ergebnisse der modernen luftelektrischen Forschung. Braunschweig. 1909. xi, 245 p. 8°. (Die Wissenschaft. Sammlung naturwissenschaftlicher und mathematischer Monographien. Heft 30.)

Nice. Observatoire.
...Annales. Tome 11. Paris. 1908. v. p. f°.
Same Tome 13. 1er fasc. Paris. 1908. v. p. f°.

Norwegian aurora polaris expedition 1902-1903.
v. 1. On the cause of magnetic storms and the origin of terrestrial magnetism, by Kr. Birkeland. Christiania. [1908.] vi, 315 p. f°.

Paris. Observatoire municipal. Montsouris.
Annales. v. 7. Paris. 1906. 535 p. 4°.
Annales. v. 8. Poris. 1907. 423 p. 4°.

Prager, Walter.
Rumänien's landwirtschaftliche Klimatographie. Halle a S. 1909. 203 p. 8°.

Prague. K. k. Sternwarte.
Magnetische und meteorologische Beobachtungen. 1908. 69. Jahr. Prag. 1909. 47 p. f°.

Russia. Central physical Nicholas observatory.
Annales. 1905. 1er partie. St. Petersburg. 1908. v. p. f°.
Annales. 1905. 2me partie. St. Petersburg. 1908. v. p. f°.
Annales. 1905. 3me partie. St. Petersburg. 1908. v. p. f°.

Schellenberg, Osmar.
Studien zur Klimatologie Greichenlands. Temperatur, Niederschläge, Bewölkung. Leipzig. 1908. 98 p. 8°. (Inaug.-diss.- Leipzig.)

Switzerland. Schweizerische meteorologische Central-Anstalt.
Annalen ... 1907. Zürich. [1909.] v. p. f°.

Tacubaya. Observatorio astronomico nacional.
Observaciones meteorologicas 1897. Mexico. 1909. 239 p. f°.

Uruguay. Instituto meteorologico nacional.
Promedios mensuales. Año 1908. [Montevideo. 1909.] 1 sheet. 42 x 83 cm.

Zi-ka-wei. Observatoire.
Code des signaux. Changhai. 1909. 13 p. 24°.
Signaux aux marins. Changhai. 1909. 23 p. 8°.

RECENT PAPERS BEARING ON METEOROLOGY AND SEISMOLOGY.

C. FITZHUGH TALMAN, Librarian.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——

American journal of science. New Haven. 4th ser. v. 27. April, 1909.
Perret, Frank A. Preliminary report of the Messina earthquake of December 28, 1908. p. 321–334.

California physical geography club. Bulletin. Berkeley. v. 2. March, 1909.
Rowell, Percy E. The San Rafael high school weather observations. p. 6–9.